



SEQUENCE LISTING

<110> Promega Corporation
Zdanovsky, Alexey
Zdanovskaia, Marina
Ma, Dongping
Wood, Keith V.
Almond, Brian
Wood, Monika G.

<120> Rapidly Degraded Reporter Fusion Proteins

<130> 341.021US1

<140> US 10/644,341

<141> 2003-09-16

<150> US 60/411,070

<151> 2002-09-16

<150> US 60/412,268

<151> 2002-09-20

<160> 88

<170> FastSEQ for Windows Version 4.0

<210> 1

<211> 28

<212> DNA

<213> Artificial Sequence

<220>

<223> A synthetic primer

<400> 1

attaatctga tcaataaagg gtttaagg

28

<210> 2

<211> 20

<212> DNA

<213> Artificial Sequence

<220>

<223> A synthetic primer

<400> 2

aaaaaggtag tggactgtcg

20

<210> 3

<211> 30

<212> DNA

<213> Artificial Sequence

<220>

<223> A synthetic primer

<400> 3

ctagatttat ttatttattt cttcatatgc

30

<210> 4
 <211> 30
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> A synthetic primer

<400> 4
 aattgcatat gaagaaataa ataaataaat

30

<210> 5
 <211> 71
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> A synthetic primer

<400> 5
 aattgggaat taaaacagca ttgaaccaag aagcttggct ttcttatcaa ttctttgtga
 cataataagt t

60
 71

<210> 6
 <211> 67
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> A synthetic primer

<400> 6
 aacttattat gtcacaaaga attgataaga aagccaagct tcttggttca atgctgtttt
 aattccc

60
 67

<210> 7
 <211> 39
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> A synthetic mutant mODC PEST sequence

<400> 7
 His Gly Phe Pro Pro Glu Met Glu Glu Gln Ala Ala Gly Thr Leu Pro
 1 5 10 15
 Met Ser Cys Ala Gln Glu Ser Gly Met Asp Arg His Pro Ala Ala Cys
 20 25 30
 Ala Ser Ala Arg Ile Asn Val
 35

<210> 8
 <211> 61
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> A synthetic primer

<400> 8
 aattctcatg gcttcccgcc ggagatggag gaggaggctg ctggcacgct gcccatgtct

60

t 61

<210> 9
 <211> 65
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> A synthetic primer

<400> 9
 gtgccagga gagcgggatg gaccgtcacc ctgcagcctg tgcttctgct aggatcaatg 60
 tgtaa 65

<210> 10
 <211> 63
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> A synthetic primer

<400> 10
 ggccttacac attgatccta gcagaagcac aggctgcagg gtgacgggcc atcccgtctt 60
 cct 63

<210> 11
 <211> 63
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> A synthetic primer

<400> 11
 gggcacaaga catgggcagc gtgccagcag cctgctcctc catctccggc gggaagccat 60
 gag 63

<210> 12
 <211> 16
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> A synthetic CL1 sequence

<400> 12
 Ala Cys Lys Asn Trp Phe Ser Ser Leu Ser His Phe Val Ile His Leu
 1 5 10 15

<210> 13
 <211> 57
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> A synthetic oligonucleotide

<400> 13
 aattcaagtg gatcacgaag tggctcaagc tgctgaacca gttcttgcag gcagaca 57

<210> 14
 <211> 57
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> A synthetic oligonucleotide

 <400> 14
 aatttgctctg cctgcaagaa ctgggttcagc agcttgagcc acttcgtgat ccacttg 57

 <210> 15
 <211> 120
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> A synthetic optimized PEST sequence

 <400> 15
 cacggcttcc ctcccgaggt ggaggagcag gccgccggca ccctgcccatt gagctgcgcc 60
 caggagagcg gcatggatag acaccctgct gcttgcgcca gcgccaggat caacgtctaa 120

 <210> 16
 <211> 25
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> A synthetic primer

 <400> 16
 agatctgcga tctaagtaag cttgg 25

 <210> 17
 <211> 26
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> A synthetic primer

 <400> 17
 actctagaat tcacggcgat ctttcc 26

 <210> 18
 <211> 40
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> A synthetic primer

 <400> 18
 ggcgaagctt gggtcacctc caaggtgtac gacccccgagc 40

 <210> 19
 <211> 38
 <212> DNA
 <213> Artificial Sequence

<220>
<223> A synthetic primer

<400> 19
gctctagaat gaattctgct cgttcttcag cacgcgct 38

<210> 20
<211> 37
<212> DNA
<213> Artificial Sequence

<220>
<223> A synthetic primer

<400> 20
tagcatgggc acccagattt tcgtgaaaac ccttacg 37

<210> 21
<211> 34
<212> DNA
<213> Artificial Sequence

<220>
<223> A synthetic primer

<400> 21
atgctaggtg accggatccc gcggataacc acca 34

<210> 22
<211> 58
<212> DNA
<213> Artificial Sequence

<220>
<223> A synthetic primer

<400> 22
ccatgggaca tcatcaccat caccacgggg atccacaagc ttatgaagaa attagcaa 58

<210> 23
<211> 39
<212> DNA
<213> Artificial Sequence

<220>
<223> A synthetic primer

<400> 23
ttctggatcc cgcggtatac caccacgaag actcaacac 39

<210> 24
<211> 39
<212> DNA
<213> Artificial Sequence

<220>
<223> A synthetic primer

<400> 24
ttctggatcc cgcgcatatac caccacgaag actcaacac 39

<210> 25
<211> 39
<212> DNA
<213> Artificial Sequence

<220>
<223> A synthetic primer

<400> 25
ttctggatcc cgcggtcac caccacgaag actcaacac

39

<210> 26
<211> 118
<212> DNA
<213> Artificial Sequence

<220>
<223> A synthetic primer

<400> 26
tatgggccct taatacgact cactataggg gaattgtgag cggataacaa ttcccctcta
gaaataattt tgtttaactt taagaaggag atataccatg cagattttcg tgaaaacc

60
118

<210> 27
<211> 43
<212> DNA
<213> Artificial Sequence

<220>
<223> A synthetic primer

<400> 27
ttttggcgtc ggtgaccgga tcccgcggtc gaccaccacg aag

43

<210> 28
<211> 43
<212> DNA
<213> Artificial Sequence

<220>
<223> A synthetic primer

<400> 28
ttttggcgtc ggtgaccgga tcccgcggtg caccaccacg aag

43

<210> 29
<211> 43
<212> DNA
<213> Artificial Sequence

<220>
<223> A synthetic primer

<400> 29
ttttggcgtc ggtgaccgga tcccgcgggt taccaccacg aag

43

<210> 30
<211> 43
<212> DNA
<213> Artificial Sequence

<220>
 <223> A synthetic primer

<400> 30
 ttttggcgctc ggtgaccgga tcccgcggat caccaccacg aag 43

<210> 31
 <211> 43
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> A synthetic primer

<400> 31
 ttttggcgctc ggtgaccgga tcccgcggga aaccaccacg aag 43

<210> 32
 <211> 43
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> A synthetic primer

<400> 32
 ttttggcgctc ggtgaccgga tcccgcggat gaccaccacg aag 43

<210> 33
 <211> 43
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> A synthetic primer

<400> 33
 ttttggcgctc ggtgaccgga tcccgcgggt gaccaccacg aag 43

<210> 34
 <211> 43
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> A synthetic primer

<400> 34
 ttttggcgctc ggtgaccgga tcccgcggga gaccaccacg aag 43

<210> 35
 <211> 43
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> A synthetic primer

<400> 35
 ttttggcgctc ggtgaccgga tcccgcggct taccaccacg aag 43

<210> 36
 <211> 43
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> A synthetic primer

 <400> 36
 ttttggcgtc ggtgaccgga tcccgcgggtt gaccaccacg aag 43

 <210> 37
 <211> 43
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> A synthetic primer

 <400> 37
 ttttggcgtc ggtgaccgga tcccgcggcc aaccaccacg aag 43

 <210> 38
 <211> 37
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> A synthetic primer

 <400> 38
 gtttttggcg tcggtgacct caccaccacg aagactc 37

 <210> 39
 <211> 37
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> A synthetic primer

 <400> 39
 gagtcttcgt ggtggtgagg tcaccgacgc caaaaac 37

 <210> 40
 <211> 24
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> A synthetic primer

 <400> 40
 gttccaggaa ccagggcgta tctc 24

 <210> 41
 <211> 24
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> A synthetic primer

<400> 41
 cgcgaggag ttgtgttgg ggac 24

<210> 42
 <211> 41
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> A synthetic primer

<400> 42
 ggcgaagctt gggtcaccga tgctaagaac attaagaagg g 41

<210> 43
 <211> 33
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> A synthetic primer

<400> 43
 gctctagaat gaattcacgg cgatcttgcc gcc 33

<210> 44
 <211> 27
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> A synthetic primer

<400> 44
 agctagcgag gctggatcgg tcccggg 27

<210> 45
 <211> 27
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> A synthetic primer

<400> 45
 gattaatggc cctttcgtcc tcgagtt 27

<210> 46
 <211> 174
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> A synthetic primer

<400> 46
 gcttgcaaga actggttcag tagcttaagc cactttgtga tccaccttaa cagccacggc 60

ttccctcccg	aggtggagga	gcaggccgcc	ggcaccctgc	ccatgagctg	cgcccaggag	120
agcgcatgg	atagacaccc	tgctgcttgc	gccagcgcca	ggatcaacgt	ctag	174

<210> 47
 <211> 936
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> A synthetic optimized Renilla luciferase DNA

<400> 47						
atggcttcca	aggtgtacga	ccccgagcaa	cgcaaacgca	tgatcactgg	gcctcagtgg	60
tggtctcgct	gcaagcaaat	gaacgtgctg	gactccttca	tcaactacta	tgattccgag	120
aagcacgccg	agaacgccgt	gattttttctg	catggtaacg	ctgcctccag	ctacctgtgg	180
aggcacgtcg	tgccctacat	cgagcccgtg	gctagatgca	tcatccctga	tctgatcgga	240
atgggttaagt	ccggcaagag	cgggaaatggc	tcatatcgcc	tccctggatca	ctacaagtac	300
ctcaccgctt	ggttcgagct	gctgaacctt	ccaaagaaaa	tcatctttgt	gggccacgac	360
tggtgggctt	gtctggcctt	tactactccc	tacgagcacc	aagacaagat	caaggccatc	420
gtccatgctg	agagtgtcgt	ggacgtgatc	gagtcctggg	acgagtggcc	tgacatcgag	480
gaggatatcg	ccctgatcaa	gagcgaagag	ggcgagaaaa	tggtgcttga	gaataacttc	540
ttcgtcgaga	ccatgctccc	aagcaagatc	atgcggaaac	tgagagcctga	ggagtctcgct	600
gcctacctgg	agccattcaa	ggagaagggc	gaggttagac	ggcctacctc	ctcctggcct	660
cgcgagatcc	ctctcggttaa	gggaggcaag	cccagcgtcg	tccagattgt	ccgcaactac	720
aacgcctacc	ttcgggccag	cgacgatctg	cctaagatgt	tcatcgagtc	cgaccctggg	780
ttcttttcca	acgttattgt	cgagggagct	aagaagttcc	ctaacaccga	gttcgtgaag	840
gtgaagggcc	tccacttcag	ccaggaggac	gctccagatg	aaatgggtaa	gtacatcaag	900
agcttcgtgg	agcgcgtgct	gaagaacgag	cagtaa			936

<210> 48
 <211> 1653
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> A synthetic optimized firefly luciferase DNA

<400> 48						
atggccgatg	ctaagaacat	taagaagggc	cctgctccct	tctaccctct	ggaggatggc	60
accgctggcg	agcagctgca	caaggccatg	aagaggtatg	ccctgggtgcc	tggcaccatt	120
gccttcaccg	atgccacat	tgaggtggac	atcacctatg	ccgagtactt	cgagatgtct	180
gtgcgcctgg	ccgagggcat	gaagaggtac	ggcctgaaca	ccaaccaccg	catcgtggtg	240
tgctctgaga	actctctgca	gttcttcatg	ccagtgctgg	gcgcctgtgt	catcgagtg	300
gccgtggccc	ctgctaacga	catttacaac	gagcgcgagc	tgctgaacag	catgggcatt	360
tctcagccta	ccgtggtgtt	cgtgtctaa	aagggcctgc	agaagatcct	gaacgtgcag	420
aagaagctgc	ctatcatcca	gaagatcatc	atcatggact	ctaagaccga	ctaccagggc	480
ttccagagca	tgtacacatt	cgtgacatct	catctgcctc	ctggcttcaa	cgagtaogac	540
ttcgtgccag	agtcttttga	cagggacaaa	accattgccc	tgatcatgaa	cagctctggg	600
tctaccggcc	tgccctaagg	cgtggccctg	cctcatcgca	ccgcctgtgt	gcgcttctct	660
cacgcccgcg	accctatttt	cggcaaccag	atcatccccg	acaccgctat	tctgagcgtg	720
gtgccattcc	accacggctt	cggcatgttc	accaccctgg	gtacctgat	ttgcggcttt	780
cgggtggtgc	tgatgtaccg	cttcgaggag	gagctgttcc	tgcgagcct	gcaagactac	840
aaaattcagt	ctgccttgc	ggtgccaacc	ctgttcagct	tcttcgctaa	gagcaccctg	900
atcgacaagt	acgacctgtc	taacctgcac	gagattgcct	ctggcgggcg	cccactgtct	960
aaggaggtgg	gcgaagccgt	ggccaagcgc	tttcatctgc	caggcatccg	ccagggtctac	1020
ggcctgaccg	agacaaccag	cgccattctg	attaccccag	agggcgacga	caagcctggc	1080
gccgtgggca	aggtggtgcc	attcttccag	gccaaggtgg	tggaacctga	caccggcaag	1140
accctgggag	tgaaccagcg	cggcgagctg	tgtgtgcgcg	gccctatgat	tatgtccggc	1200
tacgtgaata	accctgagcg	cacaaacgcc	ctgatcgaca	aggacggctg	gctgcactct	1260
ggcgacattg	cctactggga	cgaggacgag	cacttcttca	tcgtaggaccg	cctgaagtct	1320
ctgatcaagt	acaagggtca	ccagggtggc	ccagccgagc	tgaggtctat	cctgctgcag	1380
caccctaaca	ttttcgacgc	cggagtggcc	ggcctgcccg	acgacgatgc	cggcgagctg	1440

cctgccgccc	tcgtcgtgct	ggaacacggc	aagaccatga	ccgagaagga	gatcgtggac	1500
tatgtggcca	gccaggtgac	aaccgccaag	aagctgcgcg	gcggagtggg	gttcgtggac	1560
gaggtgcca	agggcctgac	cggcaagctg	gacgcccga	agatccgcga	gatcctgac	1620
aaggctaaga	aaggcggcaa	gatcgccgtg	taa			1653

<210> 49
 <211> 1653
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> A synthetic optimized mutant firefly luciferase
 DNA

<400> 49		
atggccgatg	ctaagaacat taagaagggc cctgctccct tctaccctct ggaggatggc 60	
accgctggcg	agcagctgca caaggccatg aagaggtatg ccctgggtgcc tggcaccatt 120	
gccttcaccg	atgccacat tgaggtggac atcacctatg ccgagtactt cgagatgtct 180	
gtgcgcctgg	ccgaggccat gaagaggtac ggccctgaaca ccaaccaccg catcgtggtg 240	
tgctctgaga	actctctgca gttcttcatg ccagtgtctg gcgccctgtt catcggagtg 300	
gccgtggccc	ctgctaacga catttacaac gagcgcgagc tgctgaacag catgggcatt 360	
tctcagccta	ccgtggtggt cgtgtctaa aagggcctgc agaagatcct gaacgtgcag 420	
aagaagctgc	ctatcatcca gaagatcatc atcatggact ctaagaccga ctaccagggc 480	
ttccagagca	tgtacacatt cgtgacatct catctgcctc ctggcttcaa cgagtacgac 540	
ttcgtgccag	agtctttcga cagggacaaa accattgccc tgatcatgaa cagctctggg 600	
tctaccggcc	tgctaagggt cgtggccctg acccatcgca acgcctgtgt gcgcttctct 660	
cacgcccgcg	accctatatt cggaaccag atcatccccg acaccgctat tctgagcgtg 720	
gtgccattcc	accacggctt cggcatgttc accaccctgg gctacctgat ttgcggcttt 780	
cgggtgggtg	tgatgtaccg cttcgaggag gagctgttcc tgcgcagcct gcaagactac 840	
aaaattcagt	ctgccctgct ggtgccaacc ctgttcagct tcttcgctaa gagcaccctg 900	
atcgacaagt	acgacctgtc taacctgcac gagattgcct ctggcggcgc cccactgtct 960	
aaggaggtgg	gcgaagccgt ggccaagcgc ttcatctgc caggcatccg ccagggttac 1020	
ggcctgaccg	agacaaccag cgccattctg attaccccag agggcgacga caagcctggc 1080	
gccgtgggca	aggtggtgcc attcttcgag gccaaggtgg tggacctgga caccggcaag 1140	
accctgggag	tgaaccagcg cggcgagctg tgtgtgcgcg gccctatgat tatgtccggc 1200	
tacgtgaata	accctgaggc cacaaacgcc ctgatcgaca aggacggctg gctgcactct 1260	
ggcgacattg	cctactggga cgaggacgag cacttcttca tctgggaccg cctgaagtct 1320	
ctgatcaagt	acaagggtca ccaggtggcc ccagccgagc tggagtctat cctgctgcag 1380	
caccctaaca	ttttcgacgc cggagtggcc ggccctgccc acgacgatgc cggcgagctg 1440	
cctgcgcgcg	tcgtcgtgct ggaacacggc aagaccatga ccgagaagga gatcgtggac 1500	
tatgtggcca	gccaggtgac aaccgccaag aagctgcgcg gcggagtggg gttcgtggac 1560	
gaggtgcca	agggcctgac cggcaagctg gacgcccga agatccgcga gatcctgac 1620	
aaggctaaga	aaggcggcaa gatcgccgtg taa	1653

<210> 50
 <211> 28
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> A synthetic primer

<400> 50		
gattaatggc	cctttcgtcc ttcagatt	28

<210> 51
 <211> 27
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> A synthetic primer

<400> 51
 agctagcgag gctggatcgg tcccggg 27

<210> 52
 <211> 30
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> A synthetic primer

<400> 52
 ctagatttat ttatttattt cttcatatgc 30

<210> 53
 <211> 30
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> A synthetic primer

<400> 53
 aattgcatat gaagaaataa ataaataaat 30

<210> 54
 <211> 28
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> A synthetic primer

<400> 54
 attaattctga tcaataaagg gtttaagg 28

<210> 55
 <211> 20
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> A synthetic primer

<400> 55
 aaaaaggtag tggactgtcg 20

<210> 56
 <211> 71
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> A synthetic primer

<400> 56
 aattgggaat taaaacagca ttgaaccaag aagcttggct ttcttatcaa ttctttgtga 60
 cataataagt t 71

<210> 57
 <211> 67
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> A synthetic primer

 <400> 57
 aacttattat gtcacaaaga attgataaga aagccaagct tcttggttca atgctgtttt 60
 aattccc 67

 <210> 58
 <211> 20
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> A synthetic primer

 <400> 58
 gatctgcggc cgcatatatg 20

 <210> 59
 <211> 21
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> A synthetic primer

 <400> 59
 gtgaccatat atgcggccgc a 21

 <210> 60
 <211> 57
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> A synthetic primer

 <400> 60
 aatttgctctg cctgcaagaa ctggttcagc agcttgagcc acttcgtgat ccacttg 57

 <210> 61
 <211> 57
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> A synthetic primer

 <400> 61
 aattcaagtg gatcacgaag tggctcaagc tgctgaacca gttcttgagc gcagaca 57

 <210> 62
 <211> 59
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> A synthetic primer

<400> 62
 aattctgcct gcaagaactg gttcagcagc ttgagccact tcgtgatcca cttgtaagc 59

<210> 63
 <211> 59
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> A synthetic primer

<400> 63
 ggccgcttac aagtggatca cgaagtggct caagctgctg aaccagttct tgcaggcag 59

<210> 64
 <211> 62
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> A synthetic primer

<400> 64
 gatcttatgt ctgcctgcaa gaactgggtc agcagcttga gccacttcgt gatccacttg 60
 ca 62

<210> 65
 <211> 62
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> A synthetic primer

<400> 65
 agcttgcaag tggatcacga agtgggtcaa gctgctgaac cagttcttgc aggcagacat 60
 aa 62

<210> 66
 <211> 1653
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> A synthetic optimized firefly luciferase sequence

<400> 66
 atggccgatg ctaagaacat taagaagggc cctgctccct tctaccctct ggaggatggc 60
 accgctggcg agcagctgca caaggccatg aagaggtatg ccctgggtgcc tggcaccatt 120
 gccttcaccg atgccacat tgaggtggac atcacctatg ccgagtactt cgagatgtct 180
 gtgcgcctgg ccgaggccat gaagaggtac ggcctgaaca ccaaccaccg catcgtgggtg 240
 tgctctgaga actctctgca gttcttcatg ccagtgtctg gcgccctgtt catcggagtg 300
 gccgtggccc ctgctaacga catttacaac gagcgcgagc tgctgaacag catgggcatt 360
 tctcagccta ccgtgggtgt cgtgtctaag aagggcctgc agaagatcct gaacgtgcag 420
 aagaagctgc ctatcatcca gaagatcatc atcatggact ctaagaccga ctaccagggc 480
 ttccagagca tgtacacatt cgtgacatct catctgcctc ctggcttcaa cgagtacgac 540
 ttctgtccag agtctttcga cagggacaaa accattgccc tgatcatgaa cagctctggg 600
 tctaccggcc tgcctaaggg cgtggccctg ccccatcgca ccgcctgtgt gcgcttctct 660

cacgcccgcg	accctatattt	cggcaaccag	atcatccccg	acaccgctat	tctgagcgtg	720
gtgccattcc	accacggctt	cggcatgttc	accaccctgg	gctacctgat	ttgcggcttt	780
cgggtggtgc	tgatgtaccg	cttcgaggag	gagctgttcc	tgcgcagcct	gcaagactac	840
aaaattcagt	ctgccctgct	ggtgcccaacc	ctgttcagct	tcttcgctaa	gagcaccctg	900
atcgacaagt	acgacctgtc	taacctgcac	gagattgcct	ctggcggcgc	cccactgtct	960
aaggaggtgg	gcgaagccgt	ggccaagcgc	tttcatctgc	caggcatccg	ccagggctac	1020
ggcctgaccg	agacaaccag	cgccattctg	attaccccag	agggcgacga	caagcctggc	1080
gccgtgggca	aggtggtgcc	attcttcgag	gccaagggtg	tggacctgga	caccggcaag	1140
accctgggag	tgaaccagcg	cggcgagctg	tgtgtgcgcg	gccctatgat	tatgtccggc	1200
tacgtgaata	accctgaggc	cacaaacgcc	ctgatcgaca	aggacggctg	gctgcactct	1260
ggcgacattg	cctactggga	cgaggacgag	cacttcttca	tcgtggaccg	cctgaagtct	1320
ctgatcaagt	acaagggcta	ccaggtggcc	ccagccgagc	tggagtctat	cctgctgcag	1380
caccctaaca	ttttcgacgc	cggagtggcc	ggcctgcccg	acgacgatgc	cggcgagctg	1440
cctgccgccc	tcgtcgtgct	ggaacacggc	aagaccatga	ccgagaagga	gatcgtggac	1500
tatgtggcca	gccaggtgac	aaccgccaa	aagctgcgcg	gcggagtggg	gttcgtggac	1560
gaggtgccc	agggcctgac	cggcaagctg	gacgcccgc	agatccgcga	gacccctgatc	1620
aaggctaaga	aaggcggcaa	gatcgccgtg	taa			1653

<210> 67

<400> 67
000

<210> 68

<211> 684

<212> DNA

<213> Artificial Sequence

<220>

<223> A synthetic optimized GFP sequence

<400> 68

atgggcgatga	tcaagcccga	catgaagatc	aagctgcgga	tggagggcgc	cgtgaacggc	60
cacaaattcg	tgatcgaggg	cgacgggaaa	ggcaagccct	ttgagggtaa	gcagactatg	120
gacctgaccg	tgatcgaggg	cgccccctg	cccttcgctt	atgacattct	caccaccgtg	180
ttcgactacg	gtaaccgtgt	cttcgccaa	taccccaagg	acatccctga	ctacttcaag	240
cagaccttcc	ccgagggcta	ctcgtgggag	cgaagcatga	catacgagga	ccagggaatc	300
tgtatcgcta	caaacgacat	caccatgatg	aagggtgtgg	acgactgctt	cgtgtacaaa	360
atccgcttcg	acgggggtcaa	cttccctgct	aatggcccgg	tgatgcagcg	caagacccta	420
aagtgggagc	ccagtaccga	gaagatgtac	gtgcgggacg	gcgtactgaa	gggcgatgtt	480
aatatggcac	tgctcttgga	gggaggcggc	cactaccgct	gcgacttcaa	gaccacctac	540
aaagccaaga	agggtggtga	gcttcccagc	taccacttcg	tggaccaccg	catcgagatc	600
gtgagccacg	acaaggacta	caacaagtc	aagctgtacg	agcacgccga	agcccacagc	660
ggactacccc	gccaggccgg	ctaa				684

<210> 69

<211> 1776

<212> DNA

<213> Artificial Sequence

<220>

<223> A synthetic optimized firefly luciferase

<400> 69

atggccgatg	ctaagaacat	taagaagggc	cctgctccct	tctaccctct	ggaggatggc	60
accgctggcg	agcagctgca	caaggccatg	aagaggtatg	ccctggtgcc	tggcaccatt	120
gccttcaccg	atgccacat	tgaggtggac	atcacctatg	ccgagtactt	cgagatgtct	180
gtgcgcctgg	ccgaggccat	gaagaggtag	ggcctgaaca	ccaaccaccg	catcgtggtg	240
tgctctgaga	actctctgca	gttcttcatg	ccagtgcctg	gcgccctggt	catcgagatg	300
gccgtggccc	ctgctaacga	catttacaac	gagcgcgagc	tgctgaacag	catgggcatt	360
tctcagccta	ccgtggtggt	cgtgtctaa	aagggcctgc	agaagatcct	gaacgtgcag	420

aagaagctgc	ctatcatcca	gaagatcatc	atcatggact	ctaagaccga	ctaccagggc	480
ttccagagca	tgtacacatt	cgtgacatct	catctgcctc	ctggcttcaa	cgagtacgac	540
ttcgtgccag	agtcttttca	cagggacaaa	accattgccc	tgatcatgaa	cagctctggg	600
tctaccggcc	tgcctaaggg	cgtggccctg	acccatcgca	acgctgtgt	gcgcttctct	660
cacgcccgcg	accctatttt	cggcaaccag	atcatccccg	acaccgctat	tctgagcgtg	720
gtgccattcc	accacggctt	cggcatgttc	accaccctgg	gctacctgat	ttgcggcttt	780
cgggtggtgc	tgatgtaccg	cttcgaggag	gagctgttcc	tgcgcagcct	gcaagactac	840
aaaattcagt	ctgccctgct	ggtgccaacc	ctgttcagct	tcttcgctaa	gagcaccctg	900
atcgacaagt	acgacctgtc	taacctgcac	gagattgcct	ctggcggcgc	cccactgtct	960
aaggagggtg	gcgaagccgt	ggccaagcgc	tttcatctgc	caggcatccg	ccagggctac	1020
ggcctgaccg	agacaaccag	cgccattctg	attaccccag	agggcgacga	caagcctggc	1080
gccgtgggca	aggtggtgcc	attcttcgag	gccaaggtgg	tggacctgga	caccggcaag	1140
accctgggag	tgaaccagcg	cggcgagctg	tgtgtgcgcg	gccctatgat	tatgtccggc	1200
tacgtgaata	accctgaggc	cacaaacgcc	ctgatcgaca	aggacggctg	gctgcactct	1260
ggcgacattg	cctactggga	cgaggacgag	cacttcttca	tctgtggaccg	cctgaagtct	1320
ctgatcaagt	acaagggtca	ccaggtggcc	ccagccgagc	tggagtctat	cctgctgcag	1380
caccctaaca	ttttcgacgc	cggagtggcc	ggcctgcccg	acgacgatgc	cggcgagctg	1440
cctgccgccg	tcgtcgtgct	ggaacacggc	aagaccatga	ccgagaagga	gatcgtggac	1500
tatgtggcca	gccaggtgac	aaccgccaa	aagctgcgcg	gcggagtggg	gttcgtggac	1560
gaggtgcccc	agggcctgac	cggcaagctg	gacgcccgc	agatccgcga	gatcctgac	1620
aaggctaaga	aaggcggcaa	gatcgccgtg	aattctcacy	gcttccctcc	cgaggtggag	1680
gagcaggccg	ccggcaccct	gcccattgagc	tgcgcccagg	agagcggcat	ggatagacac	1740
cctgctgctt	gcgccagcgc	caggatcaac	gtctaa			1776

<210> 70

<211> 1829

<212> DNA

<213> Artificial Sequence

<220>

<223> A synthetic optimized firefly luciferase

<400> 70

atggccgatg	ctaagaacat	taagaagggc	cctgctccct	tctaccctct	ggaggatggc	60
accgctggcg	agcagctgca	caaggccatg	aagaggtagt	ccctgggtgcc	tggcaccatt	120
gccttcaccg	atgccacat	tgagggtggac	atcacctatg	ccgagtactt	cgagatgtct	180
gtgcgcctgg	ccgaggccat	gaagagggtac	ggcctgaaca	ccaaccaccg	catcgtggtg	240
tgtcttgaga	actctctgca	gttcttcatg	ccagtgtctg	gcgcccgtgt	catcggagtg	300
gccgtggccc	ctgctaacga	catttacaac	gagcgcgagc	tgtgaacag	catgggcatt	360
tctcagccta	ccgtggtgtt	cgtgtctaag	aagggcctgc	agaagatcct	gaacgtgcag	420
aagaagctgc	ctatcatcca	gaagatcatc	atcatggact	ctaagaccga	ctaccagggc	480
ttccagagca	tgtacacatt	cgtgacatct	catctgcctc	ctggcttcaa	cgagtacgac	540
ttcgtgccag	agtcttttca	cagggacaaa	accattgccc	tgatcatgaa	cagctctggg	600
tctaccggcc	tgcctaaggg	cgtggccctg	acccatcgca	acgctgtgt	gcgcttctct	660
cacgcccgcg	accctatttt	cggcaaccag	atcatccccg	acaccgctat	tctgagcgtg	720
gtgccattcc	accacggctt	cggcatgttc	accaccctgg	gctacctgat	ttgcggcttt	780
cgggtggtgc	tgatgtaccg	cttcgaggag	gagctgttcc	tgcgcagcct	gcaagactac	840
aaaattcagt	ctgccctgct	ggtgccaacc	ctgttcagct	tcttcgctaa	gagcaccctg	900
atcgacaagt	acgacctgtc	taacctgcac	gagattgcct	ctggcggcgc	cccactgtct	960
aaggagggtg	gcgaagccgt	ggccaagcgc	tttcatctgc	caggcatccg	ccagggctac	1020
ggcctgaccg	agacaaccag	cgccattctg	attaccccag	agggcgacga	caagcctggc	1080
gccgtgggca	aggtggtgcc	attcttcgag	gccaaggtgg	tggacctgga	caccggcaag	1140
accctgggag	tgaaccagcg	cggcgagctg	tgtgtgcgcg	gccctatgat	tatgtccggc	1200
tacgtgaata	accctgaggc	cacaaacgcc	ctgatcgaca	aggacggctg	gctgcactct	1260
ggcgacattg	cctactggga	cgaggacgag	cacttcttca	tctgtggaccg	cctgaagtct	1320
ctgatcaagt	acaagggtca	ccaggtggcc	ccagccgagc	tggagtctat	cctgctgcag	1380
caccctaaca	ttttcgacgc	cggagtggcc	ggcctgcccg	acgacgatgc	cggcgagctg	1440
cctgccgccg	tcgtcgtgct	ggaacacggc	aagaccatga	ccgagaagga	gatcgtggac	1500
tatgtggcca	gccaggtgac	aaccgccaa	aagctgcgcg	gcggagtggg	gttcgtggac	1560
gaggtgcccc	agggcctgac	cggcaagctg	gacgcccgc	agatccgcga	gatcctgac	1620
aaggctaaga	aaggcggcaa	gatcgccgtg	aattctgctt	gcaagaactg	gttcagtagc	1680

ttaagccact	ttgtgatcca	ccttaacagc	cacggcttcc	ctcccgaggt	ggaggagcag	1740
gccgccggca	ccctgcccac	gagctgcgcc	caggagagcg	gcatggatag	acaccctgct	1800
gcttgcgcca	gcgccaggat	caacgtcta				1829

<210> 71

<211> 1776

<212> DNA

<213> Artificial Sequence

<220>

<223> A synthetic optimized firefly luciferase

<400> 71

atggccgatg	ctaagaacat	taagaagggc	cctgctccct	tctaccctct	ggaggatggc	60
accgctggcg	agcagctgca	caaggccatg	aagaggtatg	ccctggtgcc	tggcaccatt	120
gccttcaccg	atgcccacat	tgagggtggac	atcacctatg	ccgagtactt	cgagatgtct	180
gtgcgcctgg	ccgaggccat	gaagaggtag	ggcctgaaca	ccaaccaccg	catcgtgggtg	240
tgctctgaga	actctctgca	gttcttcatg	ccagtgtctg	gcgccctgtt	catcggagtg	300
gccgtggccc	ctgctaacga	catttacaac	gagcgcgagc	tgctgaacag	catgggcatt	360
tctcagccta	ccgtggtgtt	cgtgtctaag	aagggcctgc	agaagatcct	gaacgtgcag	420
aagaagctgc	ctatcatcca	gaagatcatc	atcatggact	ctaagaccga	ctaccagggc	480
ttccagagca	tgtacacatt	cgtgacatct	catctgcctc	ctggcttcaa	cgagtacgac	540
ttcgtgccag	agtctttcga	cagggacaaa	accattgccc	tgatcatgaa	cagctctggg	600
tctaccggcc	tgccctaagg	cgtggccctg	cctcatcgca	ccgcctgtgt	gcgcttctct	660
cacgcccgcg	accctatttt	cggcaaccag	atcatccccg	acaccgctat	tctgagcgtg	720
gtgccattcc	accacggctt	cggcatgttc	accaccctgg	gctacctgat	ttgcggcttt	780
cgggtggtgc	tgatgtaccg	cttcgaggag	gagctgttcc	tgcgacgcct	gcaagactac	840
aaaattcagt	ctgccctgct	ggtgccaaac	ctgttcagct	tcttcgctaa	gagcaccctg	900
atcgacaagt	acgacctgtc	taacctgcac	gagattgcct	ctggcggcgc	cccactgtct	960
aaggaggtgg	gcgaagccgt	ggccaagcgc	tttcatctgc	caggcatccg	ccagggctac	1020
ggcctgaccg	agacaaccag	cgccattctg	attaccccag	agggcgacga	caagcctggc	1080
gccgtgggca	aggtggtgcc	attcttcgag	gccaagggtg	tggaacctga	caccggcaag	1140
accctgggag	tgaaccagcg	cggcgagctg	tgtgtgcgcg	gccctatgat	tatgtccggc	1200
tacgtgaata	accctgaggc	cacaaacgcc	ctgatcgaca	aggacggctg	gctgcactct	1260
ggcgacattg	cctactggga	cgaggacgag	cacttcttca	tcgtggaccg	cctgaagtct	1320
ctgatcaagt	acaagggcta	ccaggtggcc	ccagccgagc	tggaagtctat	cctgctgcag	1380
caccctaaca	ttttcgacgc	cggagtggcc	ggcctgcccg	acgacgatgc	cggcgagctg	1440
cctgccgccg	tcgtcgtgct	ggaacacggc	aagaccatga	ccgagaagga	gatcgtggac	1500
tatgtggcca	gccaggtgac	aaccgccaa	aagctgcgcg	gcggagtggg	gttcgtggac	1560
gaggtggcca	agggcctgac	cggcaagctg	gacgcccgcg	agatccgcga	gatcctgac	1620
aaggctaaga	aaggcggcaa	gatcgccgtg	aattctcacg	gcttccctcc	cgaggtggag	1680
gagcaggccg	ccggcacctc	gcccatagag	tgcccccagg	agagcggcat	ggatagacac	1740
cctgctgctt	gcgccagcgc	caggatcaac	gtctaa			1776

<210> 72

<211> 1830

<212> DNA

<213> Artificial Sequence

<220>

<223> A synthetic optimized firefly luciferase

<400> 72

atggccgatg	ctaagaacat	taagaagggc	cctgctccct	tctaccctct	ggaggatggc	60
accgctggcg	agcagctgca	caaggccatg	aagaggtatg	ccctggtgcc	tggcaccatt	120
gccttcaccg	atgcccacat	tgagggtggac	atcacctatg	ccgagtactt	cgagatgtct	180
gtgcgcctgg	ccgaggccat	gaagaggtag	ggcctgaaca	ccaaccaccg	catcgtgggtg	240
tgctctgaga	actctctgca	gttcttcatg	ccagtgtctg	gcgccctgtt	catcggagtg	300
gccgtggccc	ctgctaacga	catttacaac	gagcgcgagc	tgctgaacag	catgggcatt	360
tctcagccta	ccgtggtgtt	cgtgtctaag	aagggcctgc	agaagatcct	gaacgtgcag	420

aagaagctgc	ctatcatcca	gaagatcatc	atcatggact	ctaagaccga	ctaccagggc	480
ttccagagca	tgtacacatt	cgtgacatct	catctgcctc	ctggcttcaa	cgagtacgac	540
ttcgtgccag	agtcttttga	cagggacaaa	accattgccc	tgatcatgaa	cagctctggg	600
tctaccggcc	tgcctaaggg	cgtggccctg	cctcatcgca	ccgcctgtgt	gcgcttctct	660
cacgcccgcg	accctatttt	cggcaaccag	atcatccccg	acaccgctat	tctgagcgtg	720
gtgccattcc	accacggctt	cggcatgttc	accaccctgg	gctacctgat	ttgcggcttt	780
cgggtggtgc	tgatgtaccg	cttcgaggag	gagctgttcc	tgcgcagcct	gcaagactac	840
aaaattcagt	ctgccctgct	ggtgcccaacc	ctgttcagct	tcttcgctaa	gagcaccctg	900
atcgacaagt	acgacctgtc	taacctgcac	gagattgcct	ctggcggcgc	cccactgtct	960
aaggagggtg	gcgaagccgt	ggccaagcgc	tttcatctgc	caggcatccg	ccagggctac	1020
ggcctgaccg	agacaaccag	cgccattctg	attaccccag	agggcgacga	caagcctggc	1080
gccgtgggca	aggtggtgcc	attcttcgag	gccaagggtg	tggacctgga	caccggcaag	1140
accctgggag	tgaaccagcg	cggcgagctg	tgtgtgcgcg	gccctatgat	tatgtccggc	1200
tacgtgaata	accctgaggc	cacaaacgcc	ctgatcgaca	aggacggctg	gctgcactct	1260
ggcgacattg	cctactggga	cgaggacgag	cacttcttca	tctgtggaccg	cctgaagtct	1320
ctgatcaagt	acaagggcta	ccaggtggcc	ccagccgagc	tggagtctat	cctgctgcag	1380
caccttaaca	ttttcgacgc	cggagtggcc	ggcctgccc	acgacgatgc	cggcgagctg	1440
cctgccgccg	tcgtcgtgct	ggaacacggc	aagaccatga	ccgagaagga	gatcgtggac	1500
tatgtggcca	gccaggtgac	aaccgccaa	aagctgcgcg	gcggagtggg	gttcgtggac	1560
gaggtgcccc	agggcctgac	cggcaagctg	gacgcccga	agatccgcga	gatcctgac	1620
aaggctaaga	aaggcgga	gatcgccgtg	aattctgctt	gcaagaactg	gttcagtagc	1680
ttaagccact	ttgtgatcca	ccttaacagc	cacggcttcc	ctcccagggt	ggaggagcag	1740
gcgcgcggca	ccctgccc	gagctgcgcc	caggagagcg	gcatggatag	acaccctgct	1800
gcttgcgcc	gcgccaggat	caacgtctag				1830

<210> 73

<211> 1059

<212> DNA

<213> Artificial Sequence

<220>

<223> A synthetic optimized Renilla luciferase

<400> 73

atggcttcca	aggtgtacga	ccccgagcaa	cgcaaacgca	tgatcactgg	gcctcagtgg	60
tggtctcgct	gcaagcaa	gaacgtgctg	gactccttca	tcaactacta	tgattccgag	120
aagcacgccg	agaacgccgt	gattttttctg	catggtaacg	ctgcctccag	ctacctgtgg	180
aggcacgtcg	tgctcacat	cgagcccgtg	gctagatgca	tcatccctga	tctgatcgga	240
atgggtaagt	ccggcaagag	cgggaatggc	tcatatcgcc	tcttgatca	ctacaagtac	300
ctcaccgctt	ggttcgagct	gctgaacctt	ccaaagaaaa	tcatctttgt	gggccacgac	360
tggtgggctt	gtctggcctt	tcactactcc	tacgagcacc	aagacaagat	caaggccatc	420
gtccatgctg	agagtgtcgt	ggacgtgac	gagtcctggg	acgagtggcc	tgacatcgag	480
gaggatatcg	ccctgatcaa	gagcgaagag	ggcgagaaaa	tgggtgcttga	gaataacttc	540
ttcgtcgaga	ccatgctccc	aagcaagatc	atgcggaaac	tggagcctga	ggagtctcgt	600
gcctacctgg	agccattcaa	ggagaagggc	gaggttagac	ggcctaccct	ctcctggcct	660
cgcgagatcc	ctctcgtaa	gggaggcaag	cccagcgtcg	tccagattgt	ccgcaactac	720
aacgcctacc	ttcggggccag	cgacgatctg	cctaagatgt	tcatcgagtc	cgaccctggg	780
ttcttttcca	acgctattgt	cgaggagct	aagaagttcc	ctaaccaccga	gttcgtgaag	840
gtgaagggcc	tccacttcag	ccaggaggac	gctccagatg	aaatgggtaa	gtacatcaag	900
agcttcgtgg	agcgcgtgct	gaagaacgag	cagaattctc	acggcttccc	tcccagggtg	960
gaggagcagg	ccgcggcac	cctgccc	agctgcgcc	aggagagcgg	catggataga	1020
cacctgctg	cttgcgccag	cgccaggatc	aacgtctaa			1059

<210> 74

<211> 1113

<212> DNA

<213> Artificial Sequence

<220>

<223> A synthetic optimized Renilla luciferase

```

<400> 74
atggcttcca aggtgtacga ccccgagcaa cgcaaacgca tgatcactgg gcctcagtgg      60
tgggctcgct gcaagcaaat gaacgtgctg gactccttca tcaactacta tgattccgag      120
aagcacgccc agaacgccgt gatttttctg catggtaacg ctgcctccag ctacctgtgg      180
aggcacgtcg tgcctcacat cgagcccgtg gctagatgca tcatccctga tctgatcgga      240
atgggtaagt ccggcaagag cgggaatggc tcatatcgcc tcctggatca ctacaagtac      300
ctcaccgctt ggttcgagct gctgaacctt ccaaagaaaa tcatctttgt gggccacgac      360
tggggggcct gtctggcctt tctactactc tacgagcacc aagacaagat caaggccatc      420
gtccatgctg agagtgtcgt ggacgtgatc gagtccctggg acgagtggcc tgacatcgag      480
gaggatatcg ccctgatcaa gagcgaagag ggcgagaaaa tgggtgcttga gaataacttc      540
ttcgtcgaga ccatgctccc aagcaagatc atgcggaaac tggagcctga ggagtctcgt      600
gcctacctgg agccattcaa ggagaagggc gaggttagac ggcctaccct ctctggcct      660
cgcgagatcc ctctcgtaa gggaggcaag cccgacgtcg tccagattgt ccgcaactac      720
aacgcctacc ttcggggccag cgacgatctg cctaagatgt tcatcgagtc cgaccctggg      780
ttcttttcca acgctattgt cgagggagct aagaagttcc ctaacaccga gttcgtgaag      840
gtgaagggcc tccacttcag ccaggaggac gctccagatg aaatgggtaa gtacatcaag      900
agcttcgtgg agcgcgtgct gaagaacgag cagaattctg cttgcaagaa ctggttcagt      960
agcttaagcc actttgtgat ccaccttaac agccacggct tccctcccga ggtggaggag     1020
caggccgccc gcacctgcc catgagctgc gccagggaga gcggcatgga tagacaccct     1080
gctgcttgcg ccagcgccag gatcaacgtc tag                                     1113

```

```

<210> 75
<211> 1140
<212> DNA
<213> Artificial Sequence

```

```

<220>
<223> A synthetic optimized Renilla luciferase

```

```

<400> 75
atggcttcca aggtgtacga ccccgagcaa cgcaaacgca tgatcactgg gcctcagtgg      60
tgggctcgct gcaagcaaat gaacgtgctg gactccttca tcaactacta tgattccgag      120
aagcacgccc agaacgccgt gatttttctg catggtaacg ctgcctccag ctacctgtgg      180
aggcacgtcg tgcctcacat cgagcccgtg gctagatgca tcatccctga tctgatcgga      240
atgggtaagt ccggcaagag cgggaatggc tcatatcgcc tcctggatca ctacaagtac      300
ctcaccgctt ggttcgagct gctgaacctt ccaaagaaaa tcatctttgt gggccacgac      360
tggggggcct gtctggcctt tctactactc tacgagcacc aagacaagat caaggccatc      420
gtccatgctg agagtgtcgt ggacgtgatc gagtccctggg acgagtggcc tgacatcgag      480
gaggatatcg ccctgatcaa gagcgaagag ggcgagaaaa tgggtgcttga gaataacttc      540
ttcgtcgaga ccatgctccc aagcaagatc atgcggaaac tggagcctga ggagtctcgt      600
gcctacctgg agccattcaa ggagaagggc gaggttagac ggcctaccct ctctggcct      660
cgcgagatcc ctctcgtaa gggaggcaag cccgacgtcg tccagattgt ccgcaactac      720
aacgcctacc ttcggggccag cgacgatctg cctaagatgt tcatcgagtc cgaccctggg      780
ttcttttcca acgctattgt cgagggagct aagaagttcc ctaacaccga gttcgtgaag      840
gtgaagggcc tccacttcag ccaggaggac gctccagatg aaatgggtaa gtacatcaag      900
agcttcgtgg agcgcgtgct gaagaacgag cagaattctg cttgcaagaa ctggttcagt      960
agcttaagcc actttgtgat ccaccttaac agccacggct tccctcccga ggtggaggag     1020
caggccgccc gcacctgcc catgagctgc gccagggaga gcggcatgga tagacaccct     1080
gctgcttgcg ccagcgccag gatcaacgtc tagggcgcgg actttattta tttattttctt     1140

```

```

<210> 76
<211> 1857
<212> DNA
<213> Artificial Sequence

```

```

<220>
<223> A synthetic optimized firefly luciferase

```

```

<400> 76
atggccgatg ctaagaacat taagaagggc cctgctccct tctaccctct ggaggatggc      60
accgctggcg agcagctgca caaggccatg aagaggtatg ccctgggtgcc tggcaccatt      120
gccttcaccg atgccacat tgaggtggac atcacctatg ccgagtactt cgagatgtct      180

```

gtgcgctgg	ccgaggccat	gaagaggtac	ggcctgaaca	ccaaccaccg	catcggtgtg	240
tgctctgaga	actctctgca	gttcttcatg	ccagtgtctg	gcgcctgtt	catcggagt	300
gccgtggccc	ctgctaacga	catttacaac	gagcgcgagc	tgctgaacag	catgggcatt	360
tctcagccta	ccgtggtgtt	cgtgtctaag	aagggcctgc	agaagatcct	gaacgtgcag	420
aagaagctgc	ctatcatcca	gaagatcatc	atcatggact	ctaagaccga	ctaccagggc	480
ttccagagca	tgtacacatt	cgtgacatct	catctgcctc	ctggcttcaa	cgagtacgac	540
ttcgtgccag	agtcttttga	cagggacaaa	accattgccc	tgatcatgaa	cagctctggg	600
tctaccggcc	tgcttaaggg	cgtggccctg	cctcatcgca	ccgcctgtgt	gcgcttctct	660
cacgcccgcg	accctatttt	cggcaaccag	atcatccccg	acaccgctat	tctgagcgtg	720
gtgccattcc	accacggctt	cggcatgttc	accaccctgg	gctacctgat	ttgcggcttt	780
cgggtgggtg	tgatgtaccg	cttcgaggag	gagctgttcc	tgcgacgcct	gcaagactac	840
aaaattcagt	ctgccttctg	ggtgccaacc	ctgttcagct	tcttcgctaa	gagcaccctg	900
atcgacaagt	acgacctgtc	taacctgcac	gagattgcct	ctggcggcgc	cccactgtct	960
aaggaggtgg	gcgaagccgt	ggccaagcgc	tttcatctgc	caggcatccg	ccagggctac	1020
ggcctgaccg	agacaaccag	cgccattctg	attaccccag	agggcgacga	caagcctggc	1080
gccgtgggca	aggtggtgcc	attcttctgag	gccaaggtgg	tggacctgga	caccggcaag	1140
accttgggag	tgaaccagcg	cggcgagctg	tgtgtgcgca	gccctatgat	tatgtccggc	1200
tacgtggaata	accctgaggc	cacaaacgcc	ctgatcgaca	aggacggctg	gctgcactct	1260
ggcgacattg	cctactggga	cgaggacgag	cacttcttca	tcgtggaccg	cctgaagtct	1320
ctgatcaagt	acaagggtcta	ccaggtggcc	ccagccgagc	tggagtctat	cctgctgcag	1380
caccctaaca	ttttcgacgc	cggagtggcc	ggcctgccc	acgacgatgc	cggcgagctg	1440
cctgccgccg	tcgtcgtgct	ggaacacggc	aagaccatga	ccgagaagga	gatcgtggac	1500
tatgtggcca	gccaggtgac	aaccgccaa	aagctgcgcg	gcggagtggg	gttcgtggac	1560
gaggtgcccc	agggcctgac	cggcaagctg	gacgcccgc	agatccgcga	gatcctgatc	1620
aaggctaaga	aaggcggcaa	gatcgccgtg	aattctgctt	gcaagaactg	gttcagtagc	1680
ttaagccact	ttgtgatcca	ccttaacagc	cagggttcc	ctcccagggt	ggaggagcag	1740
gccgcgggca	ccctgcccac	gagctgcgcc	caggagagcg	gcatggatag	acaccctgct	1800
gcttgcgcca	gcgccaggat	caacgtctag	ggcgcggact	ttatttattt	atttctt	1857

<210> 77

<211> 1752

<212> DNA

<213> Artificial Sequence

<220>

<223> A synthetic optimized click beetle sequence

<400> 77

atggtaaagc	gtgagaaaaa	tgtcatctat	ggccctgagc	ctctccatcc	tttgagggat	60
ttgactgccg	gcgaaatgct	gtttcgtgct	ctccgcgaagc	actctcattt	gcctcaagcc	120
ttggtcgatg	tggtcggcga	tgaatctttg	agctacaagc	agttttttga	ggcaaccgtc	180
ttgctggctc	agtcctctca	caattgtggc	tacaagatga	acgacgtcgt	tagtatctgt	240
gctgaaaaca	ataccggttt	cttcattcca	gtcatcgccg	catgggtatat	cgggtatgatc	300
gtggctccag	tcaacgagag	ctacattccc	gacgaactgt	gtaaagtcac	gggtatctct	360
aagccacaga	ttgtcttcac	cactaagaat	attctgaaca	aagtccctgga	agtccaaagc	420
cgcaccaact	ttattaagcg	tatcatcatc	ttggacactg	tggagaatat	tcacggttgc	480
gaatctttgc	ctaatttcat	ctctcgctat	tcagacggca	acatcgcaaa	ctttaaacca	540
ctccacttgc	accctgtgga	acaagttgca	gccattctgt	gtagcagcgg	tactactgga	600
ctcccaaagg	gagtcattga	gacccatcaa	aacatttgcg	tgctgtctgat	ccatgctctc	660
gatccacgct	acggcactca	gctgattcct	ggtgtcaccg	tcttggtcta	cttgcccttc	720
ttccatgctt	tcggctttca	tattactttg	ggttacttta	tggtcgggtct	ccgcgtgatt	780
atgttccgcc	gttttgatca	ggaggctttc	ttgaaagcca	tccaagatta	tgaagtcgcg	840
agtgtcatca	acgtgcctag	cgtgatcctg	tttttgtcta	agagcccact	cgtggacaag	900
tacgacttgt	cttacttgcg	tgaatttgtt	tgccgtgccc	ctccactggc	taaggagggtc	960
gctgaagtgg	ccgccaacg	cttgaatctt	ccagggattc	gttgtggctt	cggcctcacc	1020
gaatctacca	gtgcgattat	ccagactctc	ggggatgagt	ttaagagcgg	ctctttgggc	1080
cgtgtcactc	cactcatggc	tgctaagata	gctgatcgcg	aaactggtaa	ggctttgggc	1140
ccgaaccaag	tgggcgagct	gtgtatcaaa	ggccctatgg	tgagcaaggg	ttatgtcaat	1200
aacgttgaag	ctaccaagga	ggccatcgac	gacgacggct	ggttgcatte	tggtgatttt	1260
ggatattacg	acgaagatga	gcattttttac	gtcgtggatc	gttacaagga	gctgatcaaa	1320
tacaagggtg	gccaggttgc	tccagctgag	ttggaggaga	ttctgttgaa	aaatccatgc	1380
attcgcgatg	tcgctgtggg	cggcattcct	gatctggagg	ccggcgaact	gccttctgct	1440

ttcgttggtca	agcagcctgg	tacagaaatt	accgccaaag	aagtgtatga	ttacctggct	1500
gaacgtgtga	gccatactaa	gtacttgctg	ggcggtgtgc	gttttgttga	ctccatccct	1560
cgtaacgtaa	caggcaaaat	taccgcgaag	gagctgttga	aacaattgtt	ggtgaaggcc	1620
ggcggaatt	ctcacggctt	ccctcccag	gtggaggagc	aggccgccc	caccctgccc	1680
atgagctgcg	cccaggagag	cggcattgat	agacaccctg	ctgcttgctg	cagcgccagg	1740
atcaacgtct	aa					1752

<210> 78
 <211> 1833
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> A synthetic optimized click beetle sequence

<400> 78						
atggttaaagc	gtgagaaaaa	tgctcatctat	ggccctgagc	ctctccatcc	tttggaggat	60
ttgactgccg	gcgaaatgct	gtttcgtgct	ctccgcaagc	actctcattt	gcctcaagcc	120
ttggctcgatg	tggctcggcga	tgaatctttg	agctacaagg	agttttttga	ggcaaccgtc	180
ttgctggctc	agtccctcca	caattgtggc	tacaagatga	acgacgtcgt	tagtatctgt	240
gctgaaaaca	ataccggttt	cttcattcca	gtcatcgccg	catgggtatat	cggtatgatc	300
gtggctccag	tcaacgagag	ctacattccc	gacgaactgt	gtaaagtcac	gggtatctct	360
aagccacaga	ttgtcttcac	cactaagaat	attctgaaca	aagtccctga	agtccaaagc	420
cgcaccaact	ttattaagcg	tatcatcacc	ttggacactg	tggagaatat	tcacggttgc	480
gaatctttgc	ctaatttcat	ctctcgctat	tcagacggca	acatcgcaaa	ctttaaacca	540
ctccacttcg	accctgtgga	acaagttgca	gccattctgt	gtagcagcgg	tactactgga	600
ctcccaaagg	gagtcattga	gacccatcaa	aacatttgcg	tgcgtctgat	ccatgctctc	660
gatccacgct	acggcactca	gctgattcct	ggtgtcaccg	tcttgggtcta	cttgcccttc	720
ttccatgctt	tgggctttca	tattactttg	ggttacttta	tggctgggtct	ccgctgtgatt	780
atgttccgcc	gttttgatca	ggaggctttc	ttgaaagcca	tccaagatta	tgaagtccgc	840
agtgtcatca	acgtgcctag	cgtgatccctg	tttttgtcta	agagcccact	cgtggacaag	900
tacgacttgt	cttcactgcg	tgaattgtgt	tgcgggtgccg	ctccactggc	taaggagggtc	960
gctgaagtgg	ccgccaaaacg	cttgaatctt	ccagggatcc	gttgtggctt	cggcctcacc	1020
gaatctacca	gtgcgattat	ccagactctc	ggggatgagt	ttaagagcgg	ctctttgggc	1080
cgtgtcactc	cactcatggc	tgctaagatc	gctgatcgcg	aaactggtaa	ggctttgggc	1140
ccgaaccaag	tgggagagct	gtgtatcaaa	ggccctatgg	tgagcaaggg	ttatgtcaat	1200
aacgttgaag	ctaccaagga	ggccatcgac	gacgacggct	ggttgcattc	tgggtgatttt	1260
ggatattacg	acgaagatga	gcattttttac	gtcgtggatc	gttacaagga	gctgatcaaa	1320
tacaagggtg	gccagggttg	tccagctgag	ttggaggaga	ttctgttgaa	aaatccatgc	1380
attcgcgatg	tcgctgtggg	cggcattcct	gatctggagg	ccggcgaact	gccttctgct	1440
ttcgttggtca	agcagcctgg	tacagaaatt	accgccaaag	aagtgtatga	ttacctggct	1500
gaacgtgtga	gccatactaa	gtacttgctg	ggcggtgtgc	gttttgttga	ctccatccct	1560
cgtaacgtaa	caggcaaaat	taccgcgaag	gagctgttga	aacaattgtt	ggtgaaggcc	1620
ggcggaatt	ctgcttgcaa	gaactggttc	agtagcttaa	gccactttgt	gatccacctt	1680
aacagccacg	gcttccctcc	cgagggtggag	gagcaggccg	ccggcaccct	gcccattgagc	1740
tgcgcccagg	agagcggcat	ggatagacac	cctgctgctt	gcgccagcgc	caggatcaac	1800
gtctagggcg	cggactttat	ttattttattt	ctt			1833

<210> 79
 <211> 1752
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> A synthetic optimized click beetle sequence

<400> 79						
atggtgaagc	gtgagaaaaa	tgctcatctat	ggccctgagc	ctctccatcc	tttggaggat	60
ttgactgccg	gcgaaatgct	gtttcgtgct	ctccgcaagc	actctcattt	gcctcaagcc	120
ttggctcgatg	tggctcggcga	tgaatctttg	agctacaagg	agttttttga	ggcaaccgtc	180

ttgctggctc	agtcctccca	caattgtggc	tacaagatga	acgacgtcgt	tagtatctgt	240
gctgaaaaca	ataccggttt	cttcattcca	gtcatcgccg	catgggtatat	cgggtatgac	300
gtggctccag	tcaacgagag	ctacattccc	gacgaactgt	gtaaagtcac	gggtatctct	360
aagccacaga	ttgtcttcac	cactaagaat	attctgaaca	aagtcctgga	agtccaaagc	420
cgcaccaact	ttattaagcg	tatcatcatc	ttggacactg	tggagaatat	tcacggttgc	480
gaatctttgc	ctaatttcat	ctctcgctat	tcagacggca	acatcgcaaa	ctttaaacca	540
ctccacttcg	accctgtgga	acaagttgca	gccattctgt	gtagcagcgg	tactactgga	600
ctcccaaagg	gagtcatgca	gacccatcaa	aacatttgcg	tgcgtctgat	ccatgctctc	660
gatccacgcg	tgggcaactca	gctgattcct	ggtgtcaccg	tcttggtcta	cttgcccttc	720
ttccatgctt	tcggcttttag	cattactttg	ggttacttta	tggtcggtct	ccgctgatt	780
atgttccgcc	gttttgatca	ggaggctttc	ttgaaagcca	tccaagatta	tgaagtccgc	840
agtgtcatca	acgtgcctag	cgtgatcctg	tttttgtcta	agagcccact	cgtggacaag	900
tacgacttgt	cttactgcg	tgaatttgtg	tgcggtgcg	ctccactggc	taaggaggtc	960
gctgaagtgg	ccgccaaacg	cttgaatctt	ccagggattc	gttgtggctt	cggcctcacc	1020
gaatctacca	gcgctaacat	tactctctc	ggggatgagt	ttaagagcgg	ctctttgggc	1080
cgtgtcactc	cactcatggc	tgctaatgaa	gctgatcgcg	aaactggtaa	ggctttgggc	1140
ccgaaccaag	tgggcgagct	gtgtatcaaa	ggccctatgg	tgagcaaggg	ttatgtcaat	1200
aacgttgaag	ctaccaagga	ggccatcgac	gacgacggct	ggttgcatte	tggtgatttt	1260
ggatattacg	acgaagatga	gcatttttac	gtcgtggatc	gttacaagga	gctgatcaaa	1320
tacaagggtg	gccagggttg	tccagctgag	ttggaggaga	ttctgttgaa	aaatccatgc	1380
attcgcgatg	tcgctgtggt	cggcattcct	gatctggagg	ccggcgaact	gccttctgct	1440
ttcgttgtca	agcagcctgg	taaagaaatt	accgccaaag	aagtgtatga	ttacctggct	1500
gaacgtgtga	gccatactaa	gtacttgctg	ggcggcgtgc	gttttgttga	ctccatccct	1560
cgtaacgtaa	caggcaaaat	taccgcgaag	gagctgttga	aacaattggt	ggagaaggcc	1620
ggcgggaatt	cctcaggctt	ccctcccgag	gtggaggagc	aggccgcggg	caccctgccc	1680
atgagctgcg	cccaggagag	cggcatggat	agacaccctg	ctgcttgccg	cagcgccagg	1740
atcaacgtct	aa					1752

<210> 80

<211> 1833

<212> DNA

<213> Artificial Sequence

<220>

<223> A synthetic optimized click beetle sequence

<400> 80

atggtgaagc	gtgagaaaaa	tgctcatctat	ggccctgagc	ctctccatcc	tttggaggat	60
ttgactgccg	gcgaaatgct	gtttcgtgct	ctccgcgaagc	actctcattt	gcctcaagcc	120
ttggtcgatg	tggtcggcga	tgaatctttg	agctacaagg	agttttttga	ggcaaccgtc	180
ttgctggctc	agtcctccca	caattgtggc	tacaagatga	acgacgtcgt	tagtatctgt	240
gctgaaaaca	ataccggttt	cttcattcca	gtcatcgccg	catgggtatat	cgggtatgac	300
gtggctccag	tcaacgagag	ctacattccc	gacgaactgt	gtaaagtcac	gggtatctct	360
aagccacaga	ttgtcttcac	cactaagaat	attctgaaca	aagtcctgga	agtccaaagc	420
cgcaccaact	ttattaagcg	tatcatcatc	ttggacactg	tggagaatat	tcacggttgc	480
gaatctttgc	ctaatttcat	ctctcgctat	tcagacggca	acatcgcaaa	ctttaaacca	540
ctccacttcg	accctgtgga	acaagttgca	gccattctgt	gtagcagcgg	tactactgga	600
ctcccaaagg	gagtcatgca	gacccatcaa	aacatttgcg	tgcgtctgat	ccatgctctc	660
gatccacgcg	tgggcaactca	gctgattcct	ggtgtcaccg	tcttggtcta	cttgcccttc	720
ttccatgctt	tcggcttttag	cattactttg	ggttacttta	tggtcggtct	ccgctgatt	780
atgttccgcc	gttttgatca	ggaggctttc	ttgaaagcca	tccaagatta	tgaagtccgc	840
agtgtcatca	acgtgcctag	cgtgatcctg	tttttgtcta	agagcccact	cgtggacaag	900
tacgacttgt	cttactgcg	tgaatttgtg	tgcggtgcg	ctccactggc	taaggaggtc	960
gctgaagtgg	ccgccaaacg	cttgaatctt	ccagggattc	gttgtggctt	cggcctcacc	1020
gaatctacca	gcgctaacat	tactctctc	ggggatgagt	ttaagagcgg	ctctttgggc	1080
cgtgtcactc	cactcatggc	tgctaagata	gctgatcgcg	aaactggtaa	ggctttgggc	1140
ccgaaccaag	tgggcgagct	gtgtatcaaa	ggccctatgg	tgagcaaggg	ttatgtcaat	1200
aacgttgaag	ctaccaagga	ggccatcgac	gacgacggct	ggttgcatte	tggtgatttt	1260
ggatattacg	acgaagatga	gcatttttac	gtcgtggatc	gttacaagga	gctgatcaaa	1320
tacaagggtg	gccagggttg	tccagctgag	ttggaggaga	ttctgttgaa	aaatccatgc	1380
attcgcgatg	tcgctgtggt	cggcattcct	gatctggagg	ccggcgaact	gccttctgct	1440

```

ttcgttggtca agcagcctgg taaagaaatt accgccaaag aagtgtatga ttacctggct 1500
gaacgtgtga gccatactaa gtacttgctg gccggcggtgc gttttgttga ctccatccct 1560
cgtaacgtaa caggcaaaat taccgcgaag gagctgttga aacaattgtt ggagaaggcc 1620
ggcggggaatt ctgcttgcaa gaactgggtc agtagcttaa gccactttgt gatccacctt 1680
aacagccacg gcttccctcc cgaggtggag gagcaggccg ccggcaccct gccatgagc 1740
tgcgcccagg agagcggcat ggatagacac cctgctgctt gcgccagcgc caggatcaac 1800
gtctagggcg cggactttat ttatttattt ctt 1833

```

```

<210> 81
<211> 39
<212> PRT
<213> Artificial Sequence

```

```

<220>
<223> A synthetic mutant ODC peptide

```

```

<220>
<221> SITE
<222> (1)...(39)
<223> Xaa = any amino acid wherein one or more of the
      Xaa residues are not the naturally occurring
      residue

```

```

<400> 81
His Gly Phe Xaa Xaa Xaa Met Xaa Xaa Gln Xaa Xaa Gly Thr Leu Pro
 1             5             10             15
Met Ser Cys Ala Gln Glu Ser Gly Xaa Xaa Arg His Pro Ala Ala Cys
      20             25             30
Ala Ser Ala Arg Ile Asn Val
      35

```

```

<210> 82
<211> 13
<212> PRT
<213> Artificial Sequence

```

```

<220>
<223> A synthetic peptide

```

```

<400> 82
Met Glu Asp Ala Lys Asn Ile Lys Lys Lys Ile Ala Val
 1             5             10

```

```

<210> 83
<211> 24
<212> PRT
<213> Artificial Sequence

```

```

<220>
<223> A synthetic peptide

```

```

<400> 83
Met Gln Ile Phe Gly Gly His Pro Arg Asp Pro Val Thr Asp Ala Lys
 1             5             10             15
Asn Ile Lys Lys Lys Ile Ala Val
      20

```

```

<210> 84
<211> 20
<212> PRT
<213> Artificial Sequence

```

<220>

<223> A synthetic peptide

<400> 84

Met Gln Ile Phe Gly Gly His Val Thr Asp Ala Lys Asn Ile Lys Lys
1 5 10 15
Lys Ile Ala Val
20

<210> 85

<211> 24

<212> PRT

<213> Artificial Sequence

<220>

<223> A synthetic peptide

<400> 85

Met Gln Ile Phe Gly Gly Glu Pro Arg Asp Pro Val Thr Asp Ala Lys
1 5 10 15
Asn Ile Lys Lys Lys Ile Ala Val
20

<210> 86

<211> 20

<212> PRT

<213> Artificial Sequence

<220>

<223> A synthetic peptide

<400> 86

Met Gln Ile Phe Gly Gly Glu Val Thr Asp Ala Lys Asn Ile Lys Lys
1 5 10 15
Lys Ile Ala Val
20

<210> 87

<211> 24

<212> PRT

<213> Artificial Sequence

<220>

<223> A synthetic peptide

<400> 87

Met Gln Ile Phe Gly Gly Tyr Pro Arg Asp Pro Val Thr Asp Ala Lys
1 5 10 15
Asn Ile Lys Lys Lys Ile Ala Val
20

<210> 88

<211> 23

<212> PRT

<213> Artificial Sequence

<220>

<223> A synthetic peptide

<400> 88

Met Gln Ile Phe Gly Gly Tyr Pro Arg Asp Pro Glu Asp Ala Lys Asn
1 5 10 15

Ile Lys Lys Lys Ile Ala Val

20